

# RECEIVERS, METHODS, AND COMPUTER PROGRAM PRODUCTS FOR AN ANALOG MODEM THAT RECEIVES DATA SIGNALS FROM A DIGITAL MODEM

## Abstract of the Disclosure

Receivers, methods, and computer program products can be used to demodulate a data signal transmitted from a digital source, which has a network sampling rate that is synchronized with a network clock. In an illustrative embodiment, a receiver includes a two-stage interpolator that receives digital samples of the data signal as an input and produces an interpolated digital sample stream to be filtered by an adaptive fractionally spaced decision feedback equalizer. The digital samples received in the interpolator are synchronized with a local clock; however, the interpolated sample stream is synchronized with the network clock. A slicer generates symbols for the samples output from the decision feedback equalizer by comparing the samples with a reference signaling alphabet. The receiver can be used in a V.90 client modem to demodulate pulse code modulated (PCM) data transmitted as pulse amplitude modulated (PAM) signals from a digital network. In addition, the receiver is compatible with legacy analog modem front ends and transmitters. The two-stage interpolator allows the timing synchronization to be performed with extremely fine granularity, which can be useful in PCM modems that typically require relatively high signal to noise ratios.